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Teaching Tip

Applied Learning of Emerging Technology: Using Business-Relevant Examples of Blockchain

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ABSTRACT

Within the ever-changing technology and business landscape, it is imperative that students develop skills in identifying and leveraging emerging technologies to create business value in innovative and novel ways. Drawing on the Net-enabled Business Innovation Cycle framework, applied learning techniques, and current events, we developed an assignment to explore one such emerging technology – blockchain – to enhance students’ ability to apply what they have learned to solve business problems. Our findings showed that students overwhelmingly found the activity and experience beneficial in three important ways: (1) understanding an emerging technology, (2) applying the technology to contemporary business issues, and (3) leveraging what they learned to create plausible solutions to business challenges and opportunities.

Keywords: Applied learning, Blockchain, Business relevance, Dynamic capabilities, Emerging technologies, Net-enabled business innovation cycle

1. INTRODUCTION

Innovations in information technology (IT) are profoundly affecting the way in which companies conduct business. The role of IT professionals is no longer just to scan for and understand the potential value of emerging technologies. An added role of IT departments is to communicate as technology collaborators with the functional departments in an organization and therein provide innovative business solutions (Acharya, 2015). Understanding new technology and communicating and collaborating with new technology are such important skills that the Association for Computing Machinery and the IEEE Computer Society jointly emphasized the importance of being able to “adapt to new and emerging technologies in an agile manner” in their report on curriculum guidelines for baccalaureate degree programs in information technology (Sabin et al., 2017, p. 72). The report recommends that IT curricula allow students to explore emerging technologies and their potential effect on society. Moreover, the Association to Advance Collegiate Schools of Business (AACSB, 2018) accreditation standards for business programs recommend that all management and specialist programs, from the bachelor level through the doctoral level, include learning experiences that address general skill areas (e.g., communication, ethical understanding, application of

knowledge); general business knowledge areas (e.g., social responsibility, systems and processes, group and individual behaviors); and technology agility. These standards specifically note two areas for their importance to technology agility: (1) integrating emerging technologies into evidence-based decision making and (2) demonstrating the ability to adapt to new technologies rapidly.

The goal of building students’ skills in adaptability and agility by working with emerging technologies fits within a company’s capability needs. Seminal research on dynamic capabilities provides a lens for understanding a company’s ability to grow its value through technology. Dynamic capabilities describe an organization’s capacity to develop effective and efficient methods to enable rapid changes in technology (Teece, Pisano, and Shuen, 1997). The dynamic capabilities approach primarily concerns the processes that companies use to adapt their resources, routines, products, and services to survive in a constantly changing business environment (Teece, 2007, 2014; Yeow, Soh, and Hansen, 2018). Bounded within the dynamic capabilities approach, we believe that the closely related Net-enabled Business Innovation Cycle (NEBIC) theory provides a framework for understanding the importance of teaching students to recognize emerging technologies and thereby increase their impact as future employees.

1.1 Enablement through Resources

The NEBIC theory calls for “measuring, predicting, and understanding a firm’s ability to create customer value through the business use of digital networks” (Wheeler, 2002, p. 125). Net-enablement involves a company’s dynamic capability – its ability to reconfigure its resources within changing business environments to achieve a competitive advantage (Teece, Pisano, and Shuen, 1997; Eisenhardt and Martin, 2000) or simply to keep up with global competition. According to Wheeler (2002), the business innovation cycle of net-enablement encompasses four tenets that follow in sequence: (1) choosing emerging/enabling technologies, (2) matching economic opportunities with emerging/enabling technologies, (3) executing business innovation for growth, and (4) assessing customer value. Within the logic of the theory is the idea that net-enablement occurs through employee interaction which triggers organizational learning for change internally and in the market served. Net-enablement is likely to develop only when employees (as a company’s number one asset) possess the agility and ability to adapt to new technologies.

The NEBIC theory proposes that “a deep and dynamic understanding of new IT developments must precede the formulation of business strategy rather than simply configuring IT to align with strategy” (Wheeler, 2002, p. 126). Simply stated, companies should see IT as a driving force in formulating business strategy rather than merely a tool to support this strategy. To address technology as a driving force, it has become increasingly important for IT management to develop opportunities for employees to understand and engage in business opportunities (Dobbs et al., 2014). In addition, businesses should view employees as collaborators in the increasing trend away from a top-down strategy model to a bottom-up model for enabling technology in organizations (Applegate and Elam, 1992).

1.2 Development of Engagement in an Assignment

Against this background, we addressed the important skill of technology ability and agility by developing an assignment that promotes deeper thinking about emerging technologies. The assignment asked students to research an emerging technology (i.e., blockchain) and explore ways in which it could be used in the context of a significant current event – in this case, the food scares involving contaminated Romaine lettuce in 2018 and pre-cut melon in 2019 – as well as how the technology might be applied in other novel ways to create business value. It is important to note that the purpose of this assignment was not to teach students how the underlying technology works, but to promote the students’ exploration of emerging technologies and their potential effect on society and organizations, as suggested by various accrediting bodies.

We assigned this project to students in an introductory Management Information Systems (MIS) course. We believe that this course is a good fit for this assignment because it examines the role of IT in creating operational excellence, developing new products and services, and increasing intimacy and transparency between customers and suppliers. The course is also a requirement of all College of Business major programs, thereby addressing the AACSB recommendation to include technology agility as a learning experience in all business-related programs.

The next section describes the applied learning assignment. Then, in the evidence section, we present an analysis of the impact of the assignment. Next, we provide a discussion that addresses our goals for student learning outcomes as well as teaching suggestions. This discussion is followed by the conclusion.

2. APPLIED LEARNING ASSIGNMENT

It is becoming common practice to use current events as a tool to reinforce student learning in higher education. This practice is intended to develop and stimulate student discussion of the topic in lectures and online courses (Howard, 2015). Further, the practice of using current events is one approach to create an active learning environment in response to Bonwell and Eison’s (1991) influential research on creating excitement in the classroom. However, when current events are introduced through discussion, it can be difficult to understand the impact of the current event on learning and in scoring student participation, as noted in Rocca’s (2010) literature review on participation in classroom learning.

Our decision to use an individual student assignment versus student discussion offered a single equitable way to understand and score the effect of a current event on new learning through a student’s written discussion on applying emerging technology – in our case we used blockchain – to a current event. Since the advent of anytime, anywhere, and any-device computing, the ability to apply technology across vocations, disciplines, and industries has become increasingly important. Although the definition of active learning varies (Brame, 2016), it is common to frame applied learning as student engagement through hands-on or real-world applications. The State University of New York website SUNY, 2019) describes it this way:

Students apply knowledge and skills gained from traditional classroom learning to hands-on and/or real-world settings, creative projects or independent or directed research, and in turn apply what is gained from the applied experience to academic learning.

The university’s statement further explains that the learning activities can happen as part of a course.

We believe that this assignment provides a foray into critical thinking about IT and its innovative application – innovative in that technology can be used transformatively for products and services that were not originally intended for the technology. For example, blockchain originated as a technology innovation to track debits and credits in a distributed ledger – software with database-embedded commands that manage data changes for the established assets in the database. It concatenates (links in a chain) in canonical order (the general rule of mathematical order) cryptographically (encrypted codes) verified transactions (blocks) to the sequence of a list (Hackett, 2017). Once a block is added to the list, it cannot be altered (Seebacher and Maleshkova, 2018) or erased (Khan and Salah, 2017). Within the database, peer-to-peer network nodes (miners) can join. All of the nodes, or an established number of nodes, validate the transactions, and the lead node appends to the blockchain (Gupta, 2017). For cryptocurrency (digital currency), the

technology platform is meant as a form of accountability and transparency of spending without an intermediary, such as a country's treasury department.

Blockchain has many applications, including smart contracts, which are used to settle business relations between parties without an intermediary. Founded in the ethereum blockchain platform, the system executes and enforces programming language based on established contract terms in the blockchain (Khan and Salah, 2017). The exchange in the contract, which may or may not be a cryptocurrency (Mearian, 2019), gives the bearer the right to have or do something. Similar to the multi-node validation of transactions for cryptocurrency, miners of ethereum execute, enforce, and validate the transactions for the contract terms (Khan and Salah, 2017).

Blockchain encompasses decades of mature technologies, such as peer-to-peer networking, remote databases, smart contracts, and cryptography. Early adopter relationships already include a blockchain for business-to-business use, smart contracts; business-to-investor use, secure collateral; business-to-government use, secure supply chain; business-to-customer use, debit management; and consumer-to-consumer use, royalty tracking. Moreover, not all new uses of technology must involve newly developed technology. Old and new technologies can be integrated to provide a new product or service that addresses a felt business need, such as the original business plan of Uber (Milovich, 2019). To that end, for this assignment, we ask students to apply their new learning about blockchain to solve a business issue in a novel way.

The assignment we developed begins by discussing the importance of being aware of emerging technologies and the value that IT can provide an organization. We ask students first to conduct research on an emerging technology – in this case, blockchain – and then explore how this technology can be leveraged with respect to a recent event. The assignment contains four parts: (1) introduction, (2) questions, (3) follow-up survey, and (4) background videos. The full assignment can be found in the appendix. We administered the assignment via a learning management system to undergraduate students who were enrolled in an introductory MIS course that is required for all College of Business majors, typically in their sophomore or junior year. We gave the assignment at the end of the semester to allow students to apply the knowledge that they learned throughout the semester. Although the content of this course does not specifically focus on blockchain, it includes discussion of emerging technologies, including blockchain. The course also covers business processes in depth, including supply chain and logistics, so it is reasonable to expect students to have enough knowledge to answer questions that involve supply chain issues. Although we did not create a formal rubric for grading the assignment, we agreed to allocate 5 points each for the answers to the four open-ended questions and 2.5 points each for responses to the survey statements. We awarded the students 1 to 5 points for each open-ended question, depending on the thoroughness and thoughtfulness of the response.

In our specific assignment, we asked students to indicate how blockchain could have been used to aid in the recall of Romaine lettuce in 2018 and pre-cut melon in 2019. Starting with a popular issue or event in society is a reasonable attempt

to connect students with a topic that they may have experienced or heard about. Although this approach worked in our assignment, it is a preferred approach and not a required one.

We provided students with multiple links to resources on these topics, including articles and videos, and asked them how blockchain could be leveraged in innovative and novel ways to meet business challenges. For information regarding food scares, we directed students to read articles on U.S. government websites for background on the issues. We considered the government websites a neutral information source that would help to ensure that students were grounded in an understanding of the issue void of overly exhausting propaganda.

We placed the assigned questions in a progressive order that required students to first show evidence of understanding the technology and later to provide an applied learning example of an organization or industry of the student's choice. The progression required students to provide evidence of learning in four stages: (1) explaining the emerging technology, (2) describing how the technology was used in an application similar to the issue at hand, (3) applying the technology to the issue given at the beginning of the assignment, and (4) introducing the technology to an area of interest in an innovative or novel way.

We used a follow-up survey to allow students to reflect and share their thoughts about the new learning and its application. The graded assignments serve as a direct assessment of students' learning, while students' responses to the survey provide an indirect measure of students' perceptions of their learning. We used these two forms of data to evaluate the learning objectives of this assignment. Moreover, the survey data will enable us to enhance this assignment and develop other types of assignments on emerging technology. In addition, to help close the cycle in the learning process, we may modify the survey questions and/or develop new questions.

New learning and innovative ideas for the application of IT can originate from many sources. For this assignment, we used a multimedia approach in the form of written articles and video selections that were accessible via the Internet. We focused specifically on practice-based material and professional lecture series. Although we used six sources for this assignment, we scoured dozens of videos to develop a framework for student learning. For topics, we considered the credibility of the content provider, the authenticity of the message, and the target audience, based on the intent of the assignment. From a content perspective, we considered a meaningful amount of applicable content, minimal commercialization, and a reasonable amount of viewing time.

3. EVIDENCE

This teaching opportunity focuses on enhancing a student's capability to apply new knowledge in emerging technologies to address business challenges in innovative ways. It also addresses the importance of the joint guidelines of the ACM and IEEE Computer Society for being able to "adapt to new and emerging technologies in an agile manner" (Sabin et al., 2017, p. 72) in IT, in addition to the AACSB's recommendation for learning in technology agility (AACSB,

2018). To evaluate the design of our assignment, we collected data through three methods: (1) responses to a survey, (2) unsolicited feedback about the assignment, and (3) the innovative ways in which students applied their new learning about blockchain to solve a business challenge. We collected data from 80 undergraduate students, including 1 freshman, 34 sophomores, 37 juniors, and 8 seniors who were enrolled across multiple sections of an introductory MIS course.

To collect the survey data, we asked the students to rate two statements. The first statement addressed applied learning of the technology and read as follows: *Applying what I learned about blockchain to a current event helped me better understand the technology.* Students rated the statement on a 7-point Likert response scale with responses that ranged from “not at all” to “to a great extent.” The mean score for this statement was 6.250, with a standard deviation of 0.987, indicating that the students strongly believed that the assignment helped them to better understand the technology. The second statement addressed the students’ belief that they could apply this new knowledge in an innovative way and read as follows: *Applying blockchain to the farm-to-market segment, specifically, the recalls of Romaine lettuce and pre-cut melon, helped me develop innovative and novel solutions to other industries and/or organizations.* Based on the same 7-point scale, the mean score for this statement was 5.813, with a standard deviation of 1.233, again indicating that the students believed that the assignment helped them to innovate with technology based on their new learning. However, the students’ belief that they could think innovatively was not as strong as their belief that they could understand the technology. Table 1 shows student feedback from the survey.

	Measure Applied learning in a current event helped the student to understand the technology	Measure Applied learning in another area helped the student to think innovatively about the technology
Average score	6.250	5.813
Standard deviation	0.987	1.233

Table 1. Survey Results

Interestingly, after completing the survey, more than 10 percent of the students provided unsolicited feedback about their learning. In the student feedback on better understanding the technology, all of the students commented that they were previously unaware of what blockchain entailed. One student noted, “At first blockchain did not interest me, but now . . . I have a heightened interest in the topic.” Another student wrote, “Applying the knowledge that I learned to a current event definitely helped me better understand the technology.” Regarding the statement about applying new knowledge in an innovative way, one student commented that it “opened my eyes to the many potential businesses, methods of tracking, and storing reliable data that blockchain could be used for.”

The final area of data collection relates to the last question: *Using an industry or organization of your choice, how might blockchain technology be applied in innovative and novel ways to create new business value and/or solve existing business challenges?* The following are some edited excerpts from students’ responses.

One student wrote:

I think blockchain technology would greatly affect charities. It could make donating much more efficient and easier by allowing people to donate the exact amount they want directly to the desired charity. Blockchain would collect the data and let people know exactly how their donation was used. It would become one of the most trustworthy and recognized methods for donations in the future.

The assignment gave this student an understanding of the audit process built into the blockchain platform. The student found that the ability to track donations and the distribution of funds allowed blockchain to make donor transparency efficient and easy to manage.

Another student took a different approach to blockchain, saying:

Streaming services like Netflix have taken over the United States in recent years and account for almost 40% of the bandwidth in America. Netflix profits through companies that produce shows and content for their streaming platform. However, blockchain has the potential to cut out the intermediary – that is, Netflix. For example, someone who is looking to view content created by a producer could enter a blockchain created by that producer. The customer could make a payment (a transaction that could be verified quickly by all parts of the network), and once the conditions of the payment were met, they could access the content in the blockchain. In this way, blockchain could allow users to pay for content securely. The blockchain would remove the middleman and, in theory, lower prices for consumers and producers. Producers would have fewer costs to market the content and could charge a lower price than Netflix.

This student captured the ability of blockchain to streamline processes and reduce the number of intermediaries needed to get a product to market. This innovative idea followed some key attributes of blockchain, such as secure transactions and direct payment to a producer or manufacturer.

The assignment sent another student searching for innovation to address a felt business need. She wrote:

I came across an article that talks about how blockchain technology can help improve the fashion industry, titled, “How is Blockchain Technology Changing the Fashion Industry?” (LuxTag, 2019). It explained, “Using blockchain, manufacturers and designers can protect their brands against counterfeiting. For each fashion item, its origin and ownership can be tracked all the way back to its source. Counterfeit product or replicas will not have

an authentic chain of records and can thus be easily rooted out.” This would be beneficial for the designers because they would receive all the profits from the item and not have to worry about someone stealing their work and selling a similar low-quality item. Some designers and brands have already started to implement this type of technology into their garments. As mentioned in the article, in 2017, London designer Martine Jarlgaard produced the first garments with smart labels that are recorded and tracked on a blockchain; each step in the manufacturing process was recorded, from raw materials to finished product, complete with time and location stamps (LuxTag, 2019). Counterfeiting is one of the problems that the fashion industry faces, but with Jarlgaard creating her garments using blockchain technology, the industry moved in the right direction. In conclusion, while counterfeit goods will always exist, implementing blockchain technology into the fashion industry could certainly reduce the amount.

The skill of researching is a modern-day business requirement in our digital world. Although the assignment asked students to come up with an innovation, through research this student learned how blockchain documents the value chain for the fashion industry and validates the authenticity of a garment.

In a different approach to blockchain, the next student described maintaining ownership of information, noting:

The industry that I believe could benefit the most from blockchain is the medical field. The idea of having control over your personal medical records never existed before blockchain technology. The hope is that blockchain will give each patient control of his or her entire medical record through an app. With this app, patients could authorize doctor and medical provider access to their data only when needed. Experts believe that blockchain will have a presence in health care by the year 2025 because of how safe and secure it is. Blockchain is expected to give people control of their records and ultimately let them decide who gets access to them. The only way people like doctors, hospitals, and insurance companies can access their records is with permission. Startup companies like Gem Health and Tierion are working to implement blockchain medical records.

This student’s comments suggest that the idea of maintaining control of secure and authorized access to personal information is the cornerstone of blockchain. In a time of information transparency ushered in with social media, this student explained how the use of blockchain technology could secure information that should not be transparent.

Our findings support the proposition that using current events to apply new learning in technology has a significant and positive effect on student learning. In addition, because the use of technology by consumers and businesses is ubiquitous in this digital age, students earning degrees from all majors benefit from learning about technology using this approach.

4. DISCUSSION AND TEACHING SUGGESTIONS

The positive feedback we received from the student survey and the quality of the work products themselves suggest that using current events to help students learn about emerging technologies is effective. Based on the mean response to each survey question, students overwhelmingly agreed that applying a new technology to a current event helped them not only to understand the technology better but also to develop innovative and novel applications of the technology to other industries. Further, the original ideas that students generated when asked to apply the technology to create business value in an innovative and novel way provided further evidence that they were able to apply their newfound knowledge successfully. Examples of how the technology could be used included both for-profit and not-for-profit organizations. In addition, students’ application of the technology represented a variety of industries, including entertainment, fashion, and health care. The assignment asked the students to apply the technology in an innovative and novel way. However, we found that conducting research to find innovative solutions was effective as well. In each case, the students could correctly explain the application of blockchain as an emergent technology. Overall, we believe that this assignment increased both students’ understanding of an emerging technology and their ability to think critically about how an emerging technology can be applied to business problems or opportunities.

Given the diversity in majors being taught in the introductory course and keeping faithful to NEBIC in developing and enhancing student capabilities in applying emerging and enabling technologies, we purposefully stayed away from the techno-centric side of blockchain when introducing it as a plausible solution to a myriad of business challenges and opportunities. Within this backdrop, we provided a high-level introduction to the underpinnings of blockchain. Specifically, we discussed key terms and concepts, including triple-entry ledgers, the role of blocks and cryptographic keys, and the way in which consensus among a network of peers affords virtually immutable transactions and records.

We chose to use multiple types of media by having students read articles and view videos with a focus on real-world applications of the technology, including information from a prominent lecture circuit. Each type of media was intentional in both content and length. We believe that this approach keeps the material fresh by providing information from a number of sources. Additionally, although we have only conducted this assignment using blockchain as the emerging technology, it would be easily extendable to other emerging technologies. This teaching approach has its foundation in our introductory MIS course, yet the assignment could be easily adapted to varying technologies, programs, and degree levels. Adapting the assignment would support the AACSB accreditation standards that recommend that all management and specialist programs, from the bachelor level through the doctoral level, include learning experiences that address technology agility (AACSB, 2018).

Although our students submitted their assignments via the learning management system that is used to support the course, we did not discuss the completed assignments in the

classroom. In the future, we believe that it could be beneficial to student learning to have students bring their completed assignments to class and share some of their answers in an open discussion. We believe that this discussion could be especially beneficial with respect to Question 4, which asks students how blockchain technology might be applied in innovative and novel ways to create new business value and/or solve existing business challenges. Having students present their applied learning (SUNY, 2019) assignment in class would also create an active learning (Brame, 2016) environment.

5. CONCLUSION

Although day-to-day use of technology is inescapable by consumers and organizations, not all people, including students majoring in business programs, truly understand the organizational impact of emerging and disruptive technologies. Nevertheless, both employers and accrediting bodies expect students to be able to adapt to new technologies quickly and integrate them into the businesses where they come to work. Although the use of current events may help to reinforce the influence that technology has on business, only so much learning can occur without having a deeper understanding of the technology and how it can be applied in different situations.

The assignment that we developed provides evidence that applied learning of emerging technologies using business-relevant examples is helpful in stimulating new knowledge and increasing a student's dynamic capability in leveraging emerging technologies in innovative and novel ways. The students demonstrated the application of their newfound knowledge by introducing innovative ways that blockchain technology might be used in cross-industry applications. Further, the students' evaluations indicated that the assignment increased their knowledge of the technology and their belief that applying the technology to a current event helped them to extend the use of the technology to other industries and/or organizations. In addition, some students provided unsolicited, positive, written feedback about the assignment, and some students found a new interest in blockchain. With the number of technology-related current events, this assignment could be adapted for future assignments that contribute to information systems education by introducing questions about topics that include cybersecurity, artificial intelligence, machine learning, and 5G networks.

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APPENDIX. Emerging Technology Assignment

Course:
Points Possible:
Due:
Turn in Via:

Introduction:

As future business leaders, one of your ongoing responsibilities will be to continually scan the global business environment for potential enabling and emerging technologies that could serve to enhance – and in some cases disrupt – a company’s or industry’s business processes and portfolio of products and services. Blockchain is being touted as one such technology. Over the last year, titans of industry, government agencies, and today’s leading on-demand and just-in-time businesses have become increasingly aware of and/or are actively experimenting with blockchain technology.

To understand this technology and explore how it can apply to business, answer the following questions related to blockchain technology in general and with respect to recent issues in the farm-to-market segment, specifically, regarding the recent sweeping national recall of Romaine lettuce over the Thanksgiving holiday of 2018 (<https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-current-romaine-lettuce-e-coli-o157h7-outbreak>; Gottlieb, 2018) and the 16-state pre-cut melon recall in April 2019 (<https://www.fda.gov/food/outbreaks-foodborne-illness/outbreak-investigation-salmonella-carrau-linked-pre-cut-melons>; FDA, 2019).

In addition to reading these short articles, use the video resources provided below as well as your own research (cite any additional resources used) to answer the following questions. Your response to these questions (1) should be a minimum of two pages in length (single-space format, 12-point font) and (2) should not include blockchain’s use in digital currency. After answering the questions below, please respond to the two follow-up survey statements.

Questions:

After reading the articles noted above and viewing the background video links at the end of this assignment, provide evidence of your learning by answering the following questions.

1. Provide an overview of blockchain technology void of discussion about digital currency: What is it and what potential business value does it hold?
2. How might blockchain technology be leveraged in a farm-to-market design?
3. Now that you have explained blockchain technology and have discussed a possible farm-to-market design, how might a blockchain implementation have helped in the Romaine lettuce recall over Thanksgiving 2018 and the pre-cut melon recall in April 2019?
4. Using an industry or organization of your choice, how might blockchain technology be applied in innovative and novel ways to create new business value and/or solve existing business challenges?

Follow-up Survey:

On a scale of 1 to 7, where 1 represents “not at all” and 7 represents “to a great extent”), please indicate your agreement with the following two statements by highlighting your answer:

Applying what I learned about blockchain to a current event helped me better understand the technology.

Not at all			Neutral			To a great extent
1	2	3	4	5	6	7

Applying blockchain to the farm-to-market segment, specifically, the recalls of Romaine lettuce and pre-cut melon, helped me develop innovative and novel solutions to other industries and/or organizations.

Not at all			Neutral			To a great extent
1	2	3	4	5	6	7

Background Videos:

The following list contains video interviews and professional lecture series about technology to build your knowledge of IT that supplements the short current event readings noted in the introduction above. View each video before answering the questions.

1. What blockchain technology is and why it might change everything (6:26 minute video, Mostazo, 2018):
<https://www.youtube.com/watch?v=3xGLc-zz9cA>.
2. Walmart's exploration of leveraging blockchain to create trust and transparency (2:56 minute video, IBM Blockchain, 2017): <https://youtu.be/SV0KXBxSoio>.
3. IBM food trust – a blockchain platform (2:17 minute video, IBM Blockchain, 2018):
<https://youtu.be/QWijlTDHLMQ>.
4. Wyoming blockchain branding with BeefChain (6:54 minute video, Buckrail News, 2018):
<https://www.youtube.com/watch?v=nx2bBJ8KWu8>.
5. How blockchain is changing money and business (18:50 minute video, Tapscott, 2016):
https://www.ted.com/talks/don_tapscott_how_the_blockchain_is_changing_money_and_business?language=en#t-11062.
6. Industries that blockchain might disrupt (9:56 minute video, Future Thinkers, 2017):
<https://www.youtube.com/watch?v=G3psxs3gyf8>.



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